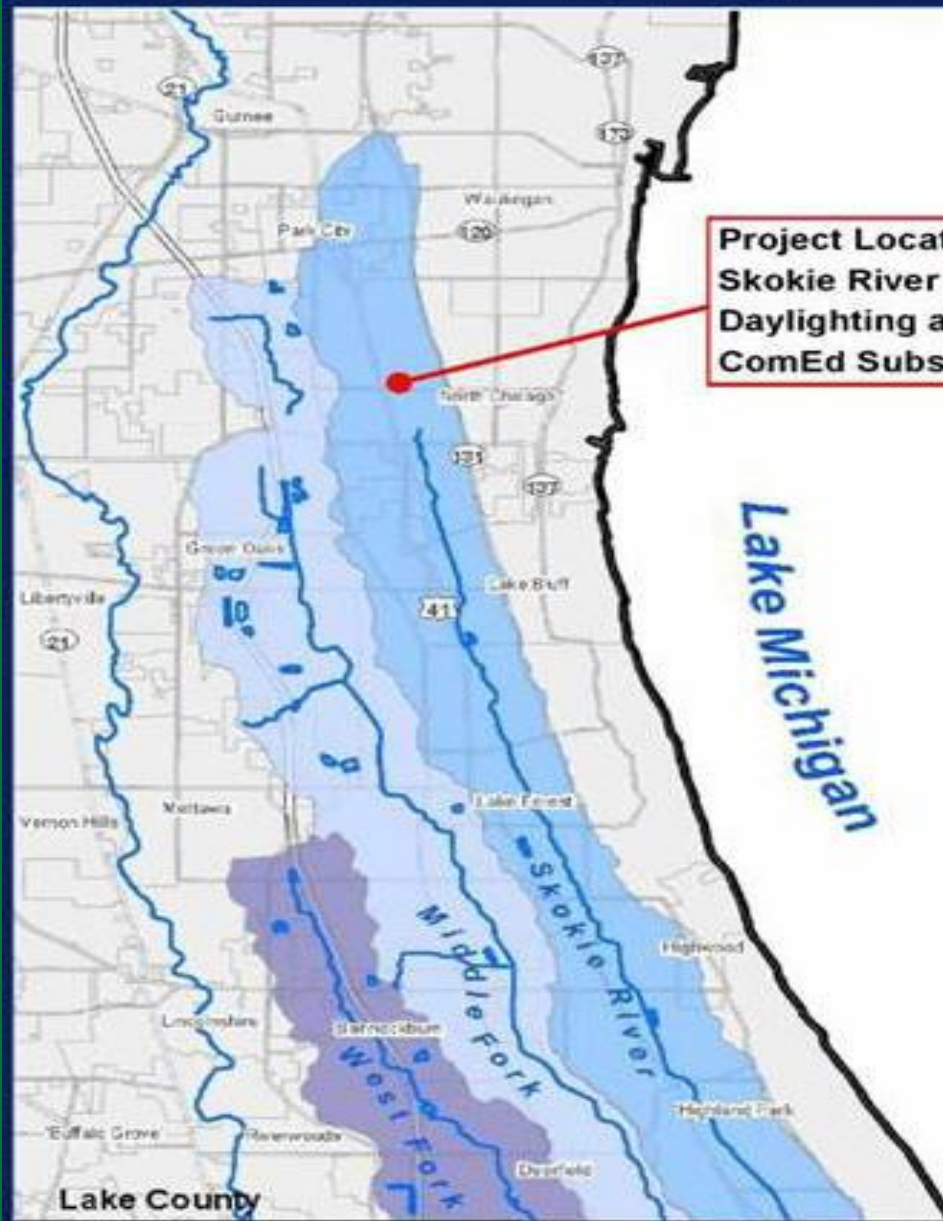


# Daylighting with two stage channels Case Study

## North Branch Chicago River Watershed-Based Plan



**Figure 1-3**

Location of the  
North Branch  
Chicago River

### Legend

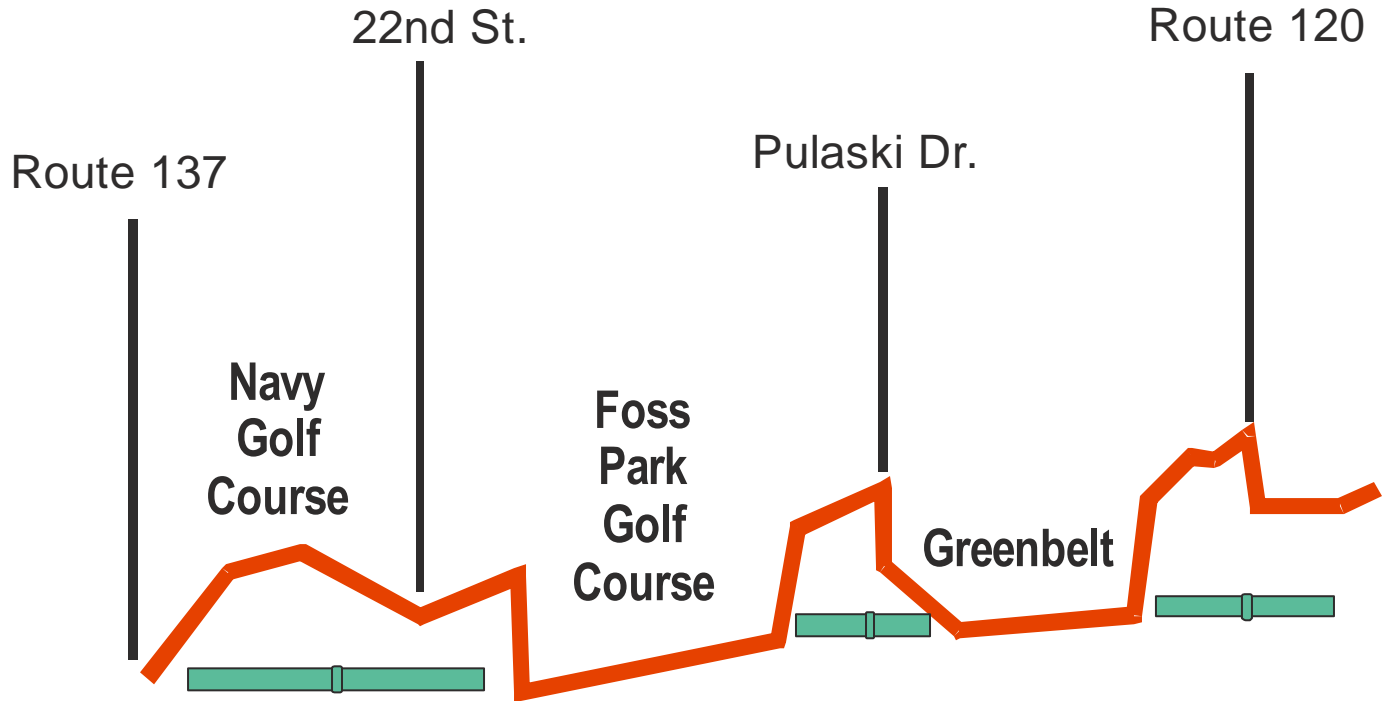
- Water
- Major Roads/Highways
- Middle Fork
- Skokie River
- West Fork
- Lake & Cook Counties

### Source:

Lake County Department of  
Information and Technology,  
GIS and Mapping Division

Lake County SMC

# Drain Tile Replacement Study



## **Pre-Construction conditions**

- **Undersized and failing drain tiles**

## **Alternative solutions:**

- (1) Replace with larger storm sewers**
- (2) Daylight using a traditional trapezoidal channel**
- (3) Daylight with two-stage ditch**

## Trapezoidal channel repairs

- **A – Jacks – concrete armor units, increases stability, but not a biodegradable method.**
- **Tree revetments – anchoring wood to the banks, can require periodic maintenance.**



## Danny Cuniff Park, Highland Park





## Danny Cunniff Park, Highland Park





## Danny Cuniff Park, Highland Park





## Deerpath Golf Course, Lake Forest





## Deerpath Golf Course, Lake Forest



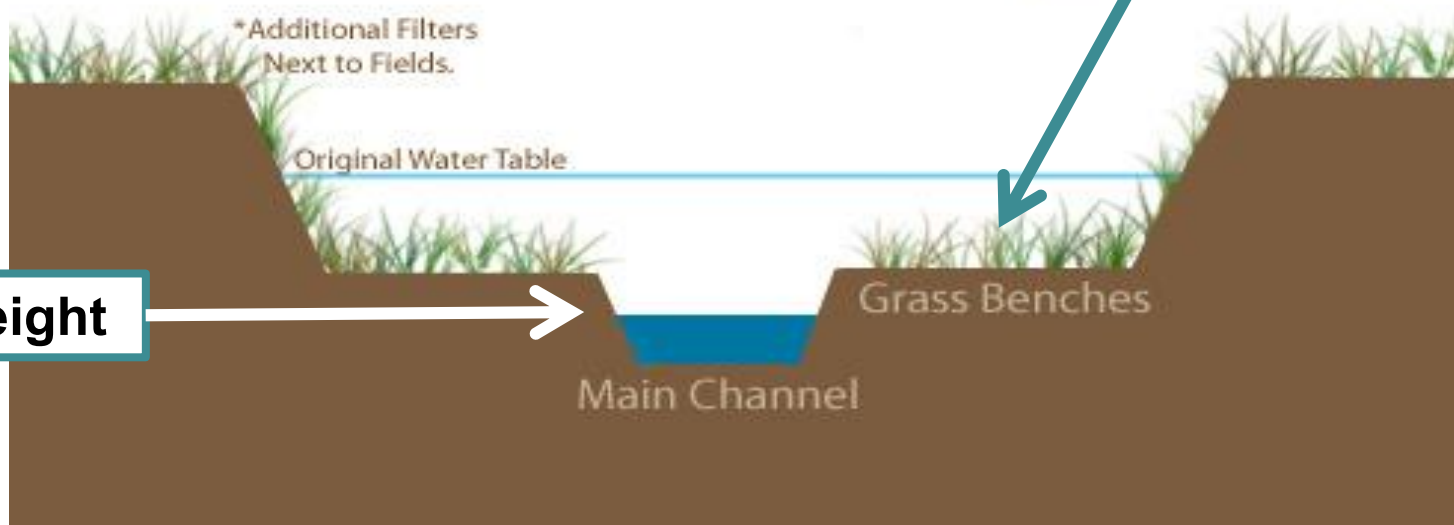




# What is a Two-Stage Channel?

## **2-Stage Channel:**

- *Natural flow channels that have been modified to incorporate “floodplain benches” above the bottom of the channel.*



**Bench width ranges; but usually 3x main channel width**

**~2-3' Height**

# Benefits of a Two-Stage Channel



- ☐ Increases flow capacity
- ☐ Improves water quality
- ☐ Increases channel stability
- ☐ Mitigates downstream flooding
- ☐ Reduces maintenance

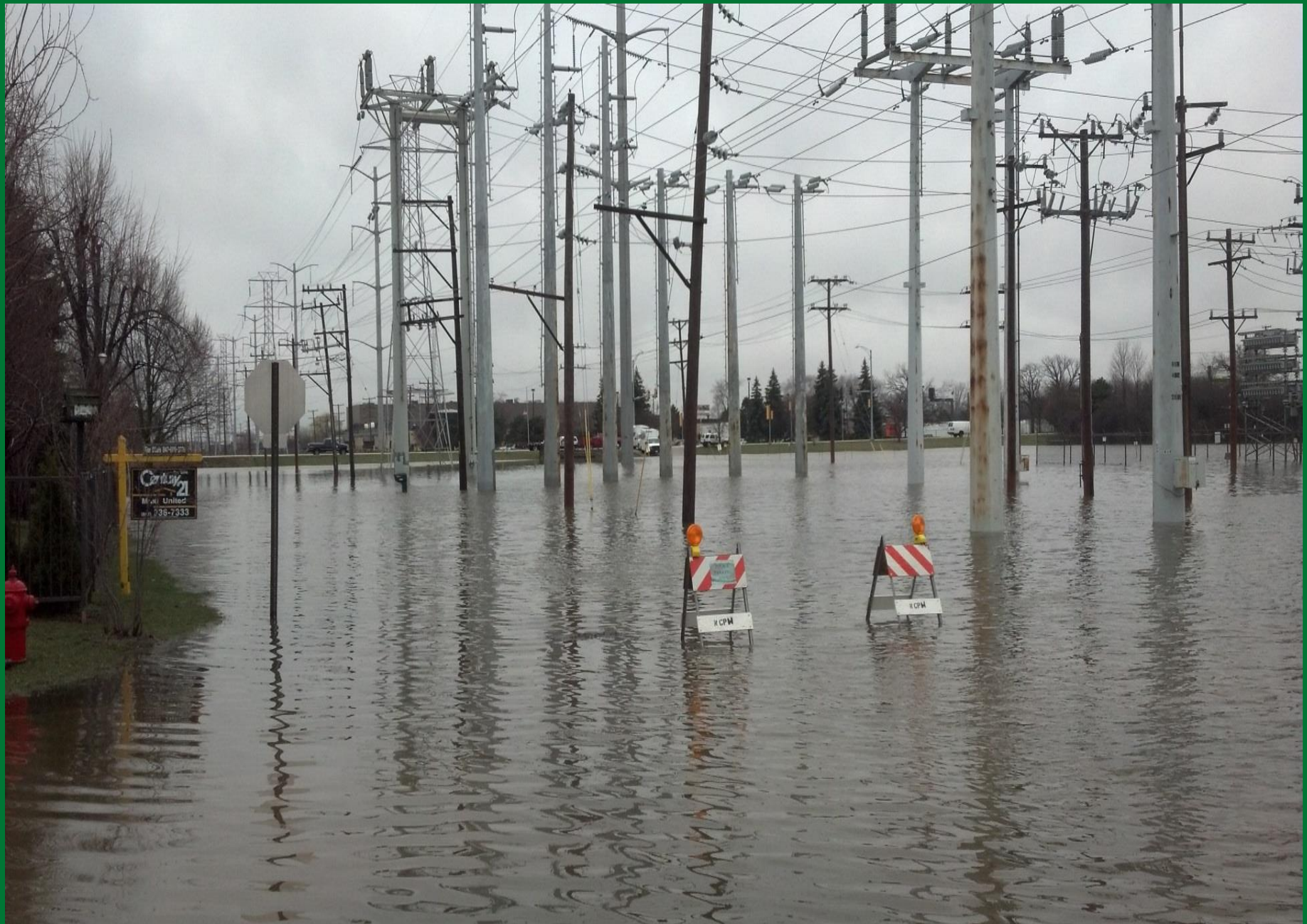




# Commonwealth Edison/Chalet Site Pre-Construction













# Commonwealth Edison/Chalet Site Vegetated Channel

- Removed 30-inch storm sewer pipe
- 984 feet of newly vegetated channel
  - 50 – 85' wide, 6-10' deep
  - 3:1 side slopes and banks seeded with IDOT Class 4A native grasses mix



*View north along the constructed channel  
Inspection: 06/01/2015*

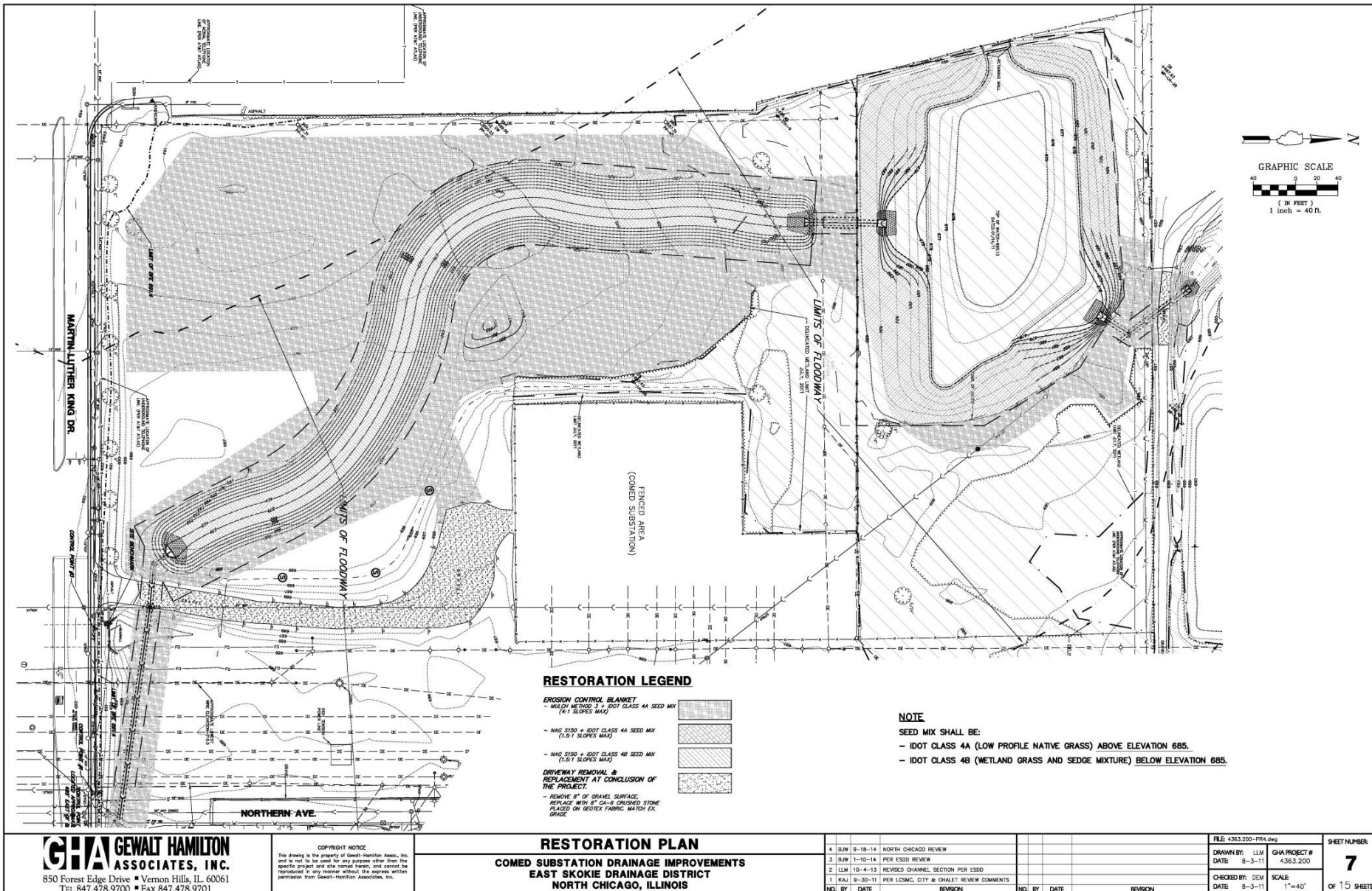


*View south along the open flowing channel  
Inspection: 07/06/2015*





# Commonwealth Edison/Chalet Site Plan View





# Proctor & Gamble Site Pre-Construction





# Proctor & Gamble Site

## Two-Stage Channel Construction



- Removed existing 24-inch and 30-inch storm sewer pipe
- Channel: 40 – 80' wide
  - 8 – 11' deep
  - Toe: protected with coir rolls



*View of North Channel*  
*Inspection: 06/26/2015*

4:1 upslope



*South Channel*  
*Inspection: 06/08/2015*

- Upslopes: 4:1
- Construction process: south to north

# Proctor & Gamble Site

## Two-Stage Channel Construction

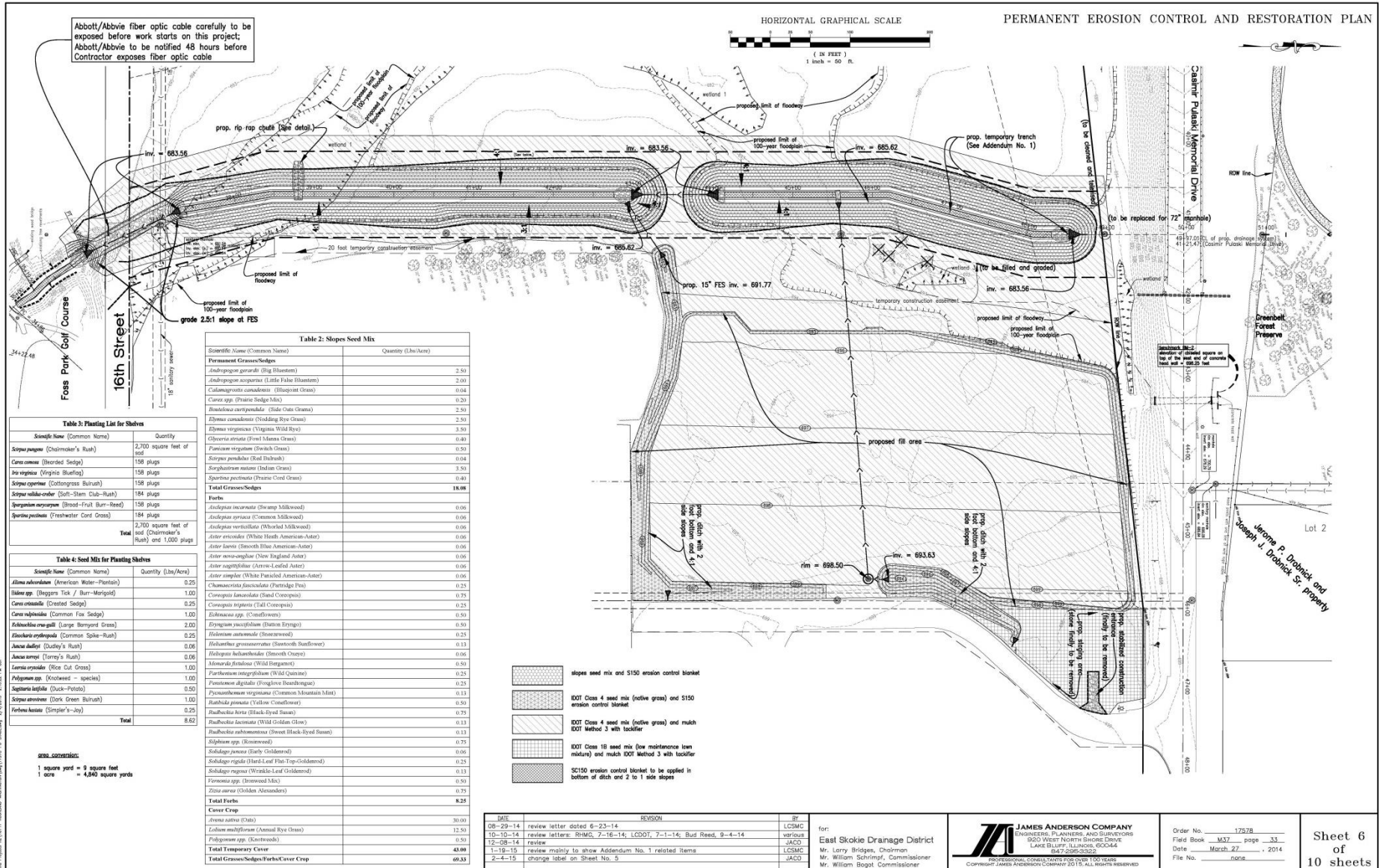


- Vegetation:
  - Chairmakers Rush salvaged from former wetland planted along the two stage shelf in front and back of the coir rolls
- Side Slopes: IDOT Class 1B seed mix (low main.)
- Banks: IDOT Class 4A seed mix and hydromulch IDOT Method 3 with tackifier





# Proctor & Gamble Site Plan View







06/09/2015





06/09/2015



06/04/2015





# Advantages of two stage channels

- **Insert channel is “self flushing”**
- **Prevents restrictions to drainage outlets**
- **Improves ditch stability**
- **Provides greater water storage, as water spreads out**
- **Reduces maintenance requirements**
- **Greater ecological benefits**



# Any Questions?

